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IS 11642-1 (1986): Aluminium Hexagonal Honeycomb Core, Part 1: General Requirements [TED 14: Aircraft and Space Vehicles]



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“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

SPECIFICATION FOR
ALUMINIUM HEXAGONAL HONEYCOMB CORE
PART 1 GENERAL REQUIREMENTS

1. **Scope** — Covers the general requirements of aluminium hexagonal honeycomb core for sandwich construction for use in aircraft floors. The methods of tests are covered in part 2.
2. **Materials** — Shall conform to Indian Standard wherever exists. Any other material approved by statutory authorities may also be used.
- 2.1 Typical properties of aluminium cores are given for purposes of guidance in Table 1.

TABLE 1 TYPICAL ROOM TEMPERATURE PROPERTIES OF ALUMINIUM HONEYCOMB CORES

Honeycomb Designation	Nominal Density kg/m³	Bare Strength MPa	Stabilized		Crush Strength MPa	Plate Shear			
			Strength MPa	Modulus GPa		'L' Direction		'W' Direction	
						Strength MPa	Modulus GPa	Strength MPa	Modulus GPa
06-03-370-(Al 52000)-P-T	36.9	1.1	1.2	0.3	0.5	1.0	0.2	0.6	0.1
06-05-690-(Al 52000)-P-T	68.9	3.3	3.5	1.0	1.6	2.2	0.5	1.4	0.2
06-08-1270-(Al 52000)-P-T	126.6	9.4	9.8	2.3	5.0	4.8	0.9	3.0	0.4
06-03-370-(Al 54300)-P-T	36.9	1.4	1.5	0.4	0.7	1.2	0.2	0.7	0.1
06-05-690-(Al 54300)-P-T	68.9	4.0	4.3	1.2	2.1	2.8	0.5	1.7	0.2

3. **Shape** — A typical hexagonal honeycomb core is shown in Fig. 1.
4. **Core Quality Requirements**
- 4.1 For the purpose of defining the core quality by physical inspection the following shall apply:
- a) Nominal dimensions and weight;
 - b) Tolerance on cell size — nominal dimensions with respect to one side of cell wall;
 - c) Degree of expansion (stretching) — number of cells over a length of 200 mm of the expanded honeycomb core;
 - d) Number of breakages of foil in the cells of expanded honeycomb core over an area of one square metre;
 - e) Number of non-stretched (adhering) sheet of foils over an area of one square metre of expanded honeycomb core;
 - f) Permissible length of peeled place in expanded honeycomb core and number of such defective places over an area of one square metre;
 - g) Density;
 - h) Deviation of the ribbon direction of anyone ribbon (or foil) in the core sheet; and
 - j) Edge defects in milled cores.

Aircraft and Space Vehicle Sectional Committee, EDC 74; Panel for Honeycomb Sandwich Panels for Aircraft, EDC 74 : P-3 [Ref : EDC 74 (4254)]

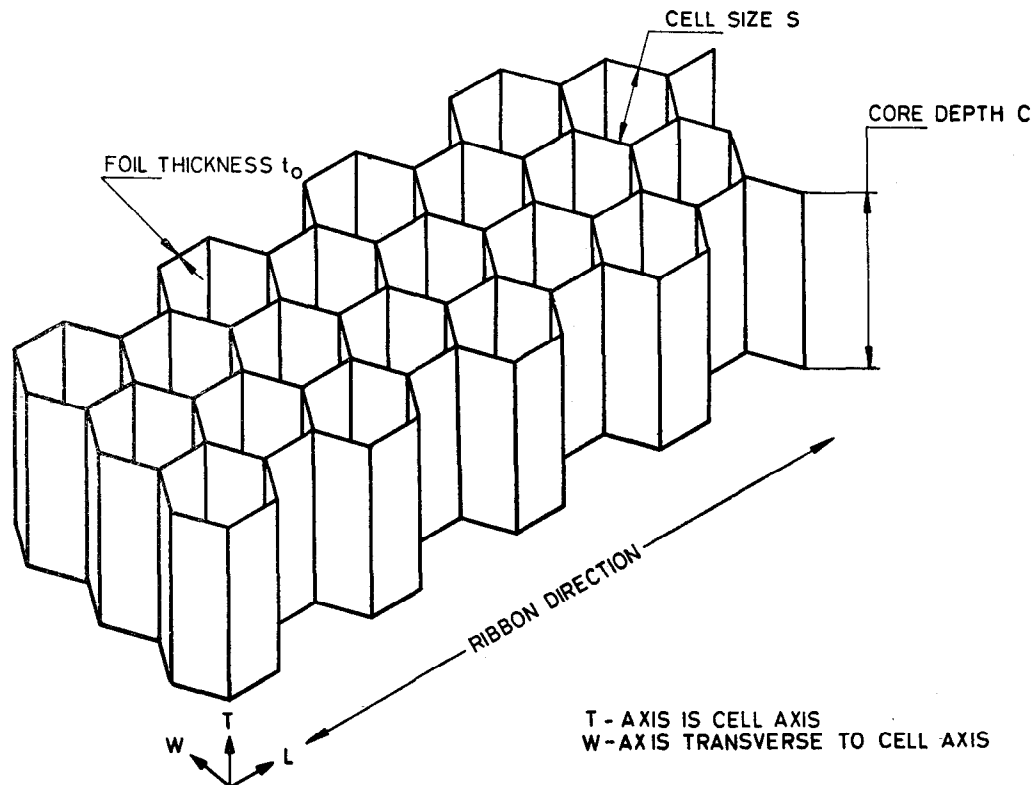


FIG. 1 TYPICAL HEXAGONAL HONEYCOMB CORE

4.2 Recommended core quality requirements for use in aircraft floors are given in Appendix A.

5. **Finish** — The finish shall be as agreed to between the supplier and the purchaser.

6. Tests

6.1 Honeycomb cores, after checking for core quality as in 4.1, shall be subjected to type approval and acceptance (quality assurance) tests as described in Part 2 of this standard.

7. Core Designation

7.1 Core shall be designated as follows:

Cell Size in mm \times foil thickness in hundredths of mm \times density in N/cubic metre \times (material grade) \times Type P or N (P for perforated and N for Non-perforated) \times T (for treatment against corrosion).

Example

$6.35 \times 0.05 \times 680 \times \text{Al 24345} \times \text{P} \times \text{T}$ is designated as 0605680 Al 24345 PT

8. **Marking** — Each expanded or unexpanded core shall be attached with a tag giving the following information:

- a) Core designation;
- b) Core serial number;
- c) Date of manufacture;
- d) Lot number/part number;
- e) IS number;
- f) Manufacturer's name or trade-mark;
- g) Made in India, if required; and
- h) Any other marking as required by statutory authorities.

9. Sampling

9.1 For the purpose of lot sampling, a lot may be defined as a group of 20 or less cores of the same type, fabricated from the same print, cured under the same conditions and manufactured under the same press.

9.2 At least 5 specimens shall be used for the tests from each lot.

APPENDIX A

(Clause 4.2)

RECOMMENDED CORE QUALITY REQUIREMENTS FOR HONEYCOMB CORE FOR AIRCRAFT USE

A-1. The recommended values for the acceptance quality of honeycomb cores for aircraft use are given below.

A-1.1 *Physical Dimensions and Weight* — Physical dimensions (does not apply to cell size) and weight shall be measured to an accuracy of ± 0.5 percent.

A-1.2 *Cell Size* — Tolerance on cell size shall be limited to ± 10 percent of its nominal size.

A-1.3 *Degree of Expansion* — The tolerance on number of cells (X) in a length 200 mm measured perpendicular to the ribbon direction shall be within $0.15 X$ to $0.20 X$ where $X = 200/\text{cell size}$.

A-1.4 *Break in Cell Foil* — Number of foil breakages shall be limited to 12 in number over an area of one square metre. Not more than one breakage per cell size shall be permitted. Defect shall be spaced at more than eight times the cell size.

A-1.5 *Adhering Foils* — Number of non-stretched sheets of foil shall be limited to not more than 5 per metre.

A-1.6 *Peeled-Off Foils* — Number of peeled-off places shall not exceed 12 over an area of one square metre in expanded core. The permissible length shall be limited to 8 times the cell size if they are repaired.

A-1.7 *Density* — Tolerance on nominal density shall be within ± 10 percent.

A-1.8 *Milled Expanded Cores* — Defects permitted on milled expanded cores shall be limited to slight tear of foil not exceeding 10 percent of the honeycomb at each milled surface, under the following conditions:

- a) in one cell damage at only one edge,
- b) in 100 cm² area 5 tearings only permitted including not more than 2 in adjacent cells, and
- c) the width of foil edge including the burr is less than the nominal foil thickness plus 0.38 mm.

A-1.9 The perforations shall be of such size and locations that all cells are vented at least every 6 mm in the thickness direction.

EXPLANATORY NOTE

While preparing this Indian Standard, reference has been made to the following:

MIL-STD 401B General specification for sandwich construction and core materials.

BMS 5052 Boeing material specification — Honeycomb core — 5052 Aluminium alloy.